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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Ryoichi Shimoi

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EXAMINER

CREPEAU, JONATHAN

ART UNIT

PAPER NUMBER

1795

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DELIVERY MODE

05/14/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/520,519	Applicant(s) SHIMO ET AL.	
	Examiner Jonathan S. Crepeau	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/7/05 8/15/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 15 and 20 are objected to because of the following informalities: In claim 15, line 1, "a pair of first interdigitated flow path and second interdigitated flow path are formed" is grammatically incorrect; in claim 20, "The method" in line 1 should be "A method." Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 and 20 recite that the separators have a gas flow path and a rib formed on the "surface opposite to the membrane electrode assembly." This language raises confusion because the ribs and flow paths are present on the surface adjacent (i.e., closest to) the MEA, not on the surface opposite to (i.e., facing away from) the MEA.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6, 7, 9-12 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 8-096820. The reference teaches a fuel cell comprising a membrane electrode assembly and first and second separators having ribs forming gas flow channels. The ribs of both separator plates have projections (246, 346, 446) thereon (see Figs. 7, 9, and 11), which function to press the respective electrodes. Regarding claims 2 and 3, the projections are formed along the entire length of the rib and are provided in parallel with each other on the rib (see Fig. 8). Regarding claims 6 and 7, the projections on both plates are positioned opposed to each other and shifted from each other (see Fig. 7). Regarding claim 9, the projection may have a flat face contact or a point contact (see Figs. 7 and 9). Regarding claim 10, the projection may be made of a different material than the rib (see Fig. 11). Regarding claim 11, the width of the projection is the same as that of the rib (see Fig. 9, base portion of projection). Regarding claim 12, the projection(s) are provided on each of the ribs of the plate, including the outermost rib.

Thus, the instant claims are anticipated.

6. Claims 1, 2, 6, 9, 13, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2002-280024. The reference teaches a fuel cell comprising a membrane electrode assembly

and first and second separators having ribs forming gas flow channels. The ribs of both separator plates have projections (34) thereon (see Figs. 1-4), which function to press the respective electrodes. Regarding claim 2, the projections are formed along the entire length of the rib (see Fig. 4). Regarding claim 6, the projections on both plates are positioned opposed to each other (see Fig. 1). Regarding claim 9, the projection has a flat face contact (see Fig. 1). Regarding claim 13, the gas flow paths are formed in a serpentine shape, and the projection is provided near a winding portion of the gas flow path bundle (see Fig. 4).

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4, 5, 8, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-096820.

The reference is applied to claims 1-3, 6, 7, 9-12 and 20 for the reasons stated above. However, the reference does not expressly teach that a plurality of projections that differ in at least one of a height and a width are provided on the rib as recited in claim 4, that at least one of a height and a width of the projection continuously changes along the direction of the rib as

recited in claim 5, that the number of projections on the ribs of the first and second separators differs as recited in claim 8, or that the projection is formed to be wider or taller downstream as recited in claims 16 and 17.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because each of these recitations represents a modification that is within the capabilities of a skilled artisan. As disclosed throughout the reference, the purpose of the invention of JP '820 is to enlarge the area of the gas diffusion electrode contributing to the electrochemical reaction by reducing contact pressure with the separator. The skilled artisan would be motivated to further modify the configurations shown in JP '820 in an attempt to further the purposes of the invention. For example, the artisan would be motivated to modify the projections in an upstream-downstream direction because it is known that reactant gas pressure is highest at the inlet of the flow field. Therefore, the reduction of contact pressure at the beginning of the flow field would be advantageous, which is encompassed by the structures of instant claims 5, 16 and 17. Further, the use of a plurality of ribs differing in height or width in an upstream-downstream direction would be obvious based on the above rationale and the reference's disclosure of plural projections on each rib (Fig. 7). Further, regarding claim 5, the number of projections on the ribs of the two separators may be varied to account for pressure differences between the reactant gases. Accordingly, the subject matter of the instant claims is believed to be obvious to a skilled artisan.

9. Claims 14, 15, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-096820 in view of Wilson (U.S. Patent 5,641,586).

JP '820 is applied to claims 1-3, 6, 7, 9-12 and 20 for the reasons stated above. However, the reference does not expressly teach the use of interdigitated flow channels as recited in claims 14 and 15, or that the projection is formed to be wider or taller downstream as recited in claims 18 and 19.

Wilson is directed to a fuel cell having an interdigitated flow field.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the flow field of Wilson in the fuel cell of JP '820. In column 5, line 61, Wilson teaches that "FIG. 5 clearly indicates that the use of interdigitated flow channels reduces pressure drops by at least an order of magnitude." Accordingly, the artisan would be motivated to use the flow field of Wilson in the fuel cell of JP '820. It would further be obvious to locate the projections of JP '820 at any area of the interdigitated flow field, thereby rendering the subject matter of claims 14 and 15 obvious.

Regarding claims 18 and 19, the subject matter of these claims would be rendered obvious for the reasons stated in the preceding rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299.

The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jonathan Crepeau/
Primary Examiner, Art Unit 1795
May 17, 2008